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The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PAUL TAICHIANG YU, STEVEN D. BURCH,
JOHN C. FAGLEY, ANNETTE M. BRENNER, and REENA L. DATTA

Appeal 2010-001756
Application 10/664,503
Technology Center 1700

Before JEFFREY T. SMITH, BEVERLY A. FRANKLIN, and
KAREN M. HASTINGS, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants seek our review under 35 U.S.C. § 134 of the Examiner's final decision rejecting claims 1-10 and 20-23. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

Claim 1 is illustrative of the subject matter on appeal (emphasis added):

1. A water-gas shift reactor system comprising:

a first stage water-gas shift reactor receiving a reformate gas, said first stage reactor including a catalyst that converts carbon monoxide and water to carbon dioxide and hydrogen;

a heat exchanger receiving the reformate gas from the first stage reactor, said heat exchanger cooling the reformate gas, said heat exchanger including a catalyst that converts carbon monoxide and water to carbon dioxide and hydrogen, said first stage water-gas shift reactor being coupled to an inlet end of the heat exchanger by a first connector; and

a second stage water-gas shift reactor receiving the cooled reformate gas from the heat exchanger, said second stage reactor including a catalyst that converts carbon monoxide and water to carbon dioxide and hydrogen, said second stage water-gas shift reactor being coupled to an outlet end of the heat exchanger by a second connector *so that the first stage water-gas shift reactor, the heat exchanger and the second stage water-gas shift reactor are combined as a single unit.*

The Examiner maintains, and Appellants appeal, the following rejections under 35 U.S.C. § 103(a):

a) claims 1, 3-10, 20, 21 and 23 as unpatentable over Seaba (US 2002/0168307 A1, issued November 14, 2002);

- b) claims 2 and 22 as unpatentable over the combined prior art of Seaba and Valensa (US 2004/0089438 A1, issued May 13, 2004); and
- c) claims 1, 4-6 and 8-10 as unpatentable over the combined prior art of Eguchi (5,221,524, issued June 22, 1993) and Hunter (4,288,346 issued September 8, 1981).

MAIN ISSUE ON APPEAL

Appellants do not separately argue the claims in each ground of rejection; nor do they separately argue the claims rejected separately from grounds a and c (App. Br. 5-10). Accordingly, we select claim 1 for deciding the issues on appeal.

The main issue on appeal is:

Did the Examiner reversibly err in determining that the water-gas shift reactor assembly of claim 1 would have been obvious over either Saeba, or the combined prior art of Eguchi and Hunter, because, as alleged by Appellants, there is no suggestion to combine the first stage reactor, the heat exchanger, and the second stage reactor of Saeba or Eguchi “as a single unit” as recited in claim 1? (App. Br. 5-10)

We answer this question in the negative, and affirm all of the § 103 rejections.

PRINCIPLES OF LAW

In assessing whether a claim to a combination of prior art elements would have been obvious, the question to be asked is whether the improvement of the claim is more than the predictable use of prior art elements according to their established functions. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). The analysis need not seek out precise

teachings directed to the specific subject matter of the claim, for it is proper to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. *Id.* at 418.

“For obviousness under § 103, all that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988).

ANALYSIS

We have thoroughly reviewed each of Appellants arguments for patentability. However, we are in agreement with the Examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art.

Accordingly, we will sustain the Examiner’s rejections for essentially those reasons expressed in the Answer, including the Response to Argument section, and we add the following primarily for emphasis.

Appellants contend that none of the references disclose the “connector” limitations of the first and second water gas shift (WGS) reactors with the intervening heat exchanger, and the resulting “combined as a single unit” limitation (App. Br. 6, 7). However, there is no dispute with the Examiner’s findings that Saeba, or Eguchi and Hunter, exemplify the three components recited in claim 1 (i.e., a first stage WGS reactor, followed by and connected to a heat exchanger, followed by and connected to a second stage WGS reactor) (*see Ans.; App. Br.; Reply Br, generally*). The Examiner thus reasonably found that Saeba, or Eguchi and Hunter, discloses the invention substantially as recited in claim 1 except that the three components are not “integral” (that is, “combined as a single unit” as claimed) (Ans. 3, 7). The Examiner contends that it would have been

obvious to one of ordinary skill in the art to make the first and second shift reactors integral with the intervening heat exchanger, to “increase heat efficiency”¹ and citing MPEP 2144.04 V B, (Ans. 3 and 7), which refers to *In re Larson*, 340 F.2d 965, 968 (CCPA 1965) (making separate parts integral involves only routine engineering design).

In this regard, the Appellants contend that, in contrast to the court in *Larson*, the court in *Schenk v. Norton* found claims to an integral construction of prior art elements to be patentable because they “provided a need not found in the prior art” (App. Br. 7; citing, *inter alia, Carl Schenk, A.G. v. Norton Corp.*, 713 F. 2d 782 (Fed. Cir. 1983)). However, this record is devoid of any persuasive technical reasoning or evidence of any such need for the claimed WGS reactor assembly (App. Br.; Reply Br. generally).

In reviewing the relevant facts of this case, we agree with the Examiner that combining the known prior art components of a first water gas shift reactor, a heat exchanger and a second water gas shift reactor “as a

¹ We note that Appellants presented arguments for the first time in the Reply Brief filed August 26, 2009, directed to rebutting the Examiner’s statement that making the elements integral would provide better thermal efficiency. See Reply Brief generally. It is inappropriate for Appellants to discuss for the first time in the Reply Brief matters that could have been raised in the Appeal Brief. As the Board has recently found, “[t]he failure to raise all issues and arguments diligently, in a timely fashion, has consequences,” and thus, such newly-raised arguments are technically waived. *Ex parte Borden*, 93 USPQ2d 1473, 1475 (BPAI 2010) (informative decision) (“[T]he reply brief [is not] an opportunity to make arguments that could have been made in the principal brief on appeal to rebut the Examiner’s rejections, but were not.”). Nonetheless, we do not find Appellants’ argument persuasive of reversible error in the Examiner’s determination that it would have been *prima facie* obvious to integrate these elements as a single unit for the reasons set out in our decision.

single unit” as claimed would have been obvious to one of ordinary skill in the art. Notably, Appellants’ specification is devoid of any details of making these known elements “combined as a single unit”, and merely depicts three adjacent boxes, one for each element (Figure 2; Spec. para. [0024]). Further, there is no explicit definition of what constitutes “a single unit”; indeed the Specification does not appear to use this term (*generally* Spec.).

There is no evidence that any differences in function or unexpected results are attained by forming these components as a single unit. *KSR*, 550 U.S. at 417. Such an integrally formed unit would reasonably be expected to function to perform the same reactions in substantially the same way, as would have been expected by one of ordinary skill. There is no persuasive evidence that making these components integral would have been beyond the skill of one of ordinary skill in the art. *Id.* Contrary to Appellants’ assertions (App. Br. 8), the results of combining these units (e.g., such that the size and weight can be reduced) would have been expected results. In this regard, the claimed invention merely applies the well-known technique of making various structural features integral to yield predictable results. See *KSR*, 550 U.S. at 415-16 (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

It is now well established that ordinary creativity is presumed on the part of one of ordinary skill in the art. See *KSR*, 550 U.S. at 421 (“[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.”). The Supreme Court has rejected the rigid requirement of a teaching, suggestion or motivation in order to establish obviousness. *KSR*, 550 U.S. at

418-19. Implicit motivation to combine has been found to exist when the improvement is technology-independent and the combination of references, or modification, results in a product that is more desirable (*e.g.*, “stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient.”). *Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). In such situations, the proper question is whether one of ordinary skill in the art possesses knowledge and skills rendering him capable of making the proposed modification to the prior art references. *Id.*

Thus, in view of the above, the Examiner’s determination that integrally forming these components as a single unit would have been obvious to one of ordinary skill in the art is reasonable.

Notably, Appellants have not provided any persuasive technical reasoning nor evidence that the artisan could not have predictably combined the known components into a single unit as claimed (App. Br.; Reply Br. generally).

In light of these circumstances, the preponderance of the evidence supports all of the Examiner’s rejections, and Appellants have not shown reversible error in the Examiner’s determination that the subject matter of independent claim 1 (as well as all the remaining not separately argued claims) would have been obvious, within the meaning of 35 U.S.C. § 103, over the applied prior art based on either Saeба, or Eguchi and Hunter.

Accordingly, we sustain each of the § 103 rejections of the claims on appeal.

DECISION

The decision of the Examiner is affirmed.

Appeal 2010-001765
Application 10/664,503

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED

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